Self-rated general and oral health and associated factors in independently-living older individuals

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Abstract: The aim of this study was to verify the association between sociodemographic, general health, and oral health data with self-rated general health (SRGH) and self-rated oral health (SROH) in independent-living older Brazilians. This cross-sectional study was part of a larger study with older individuals living independently in the city of Campinas, Brazil – the "Rede FIBRA" Study (the Frailty in Brazilian Elderly Study). A random sample of 688 older individuals responded the SRGH and 673, the SROH. SRHG and SROH were both assessed using a single item. The questionnaire included sociodemographic, general, and oral health data. The mean age was 72.28 ± 5.4 years. The adjusted analysis revealed that the probability of rating general health as bad was higher for illiterate participants (PR: 1.77, 95%CI: 1.13–2.77) or with low educational level (PR: 1.76, 95%CI: 1.17–2.65), those with depressive symptoms (PR: 1.45, 95%CI:1.21–1.74), participants that self-reported food limitation due to problems with denture or lack of it (PR: 1.29, 95%CI: 1.05–1.56), and those with xerostomia (PR 1.40, 95%CI: 1.17–1.67). The probability of rating general health as bad was lower for participants that presented 0-2 chronic diseases (PR: 0.64, 95%CI: 0.53–0.78) and were pre-frail (PR: 0.76, 95%CI: 0.61-0.96). With regard to SROH, the probability of rating oral health as bad was higher for participants with natural teeth (PR:1.61, 95%CI: 1.24–2.08), that reported xerostomia (PR: 1.44, 95%CI: 1.13–1.84), and food limitation due to problems with denture or lack of it (PR: 1.43, 95%CI: 1.07–1,91), and lower for participants that reported having enough money to cover daily expenses (PR: 0.78, 95%CI: 0.61–0.99). Oral health data and income seem to be related to self-perceptions of general and oral health.

Keywords: Aged; Oral Health; Self Concept; Health Services for the Aged.

Introduction

With population aging, the prevalence of chronic diseases and limitations due to physiological decline and use of medications increase. Therefore, it is important to understand how older people deal with age-related changes. The clinical assessment of health status may underestimate the adaptive strategies for coping with difficulties and limitations. For the elderly, an individual evaluation of health is considerably influenced by the level of emotional well-being and physical function.[1] Previous studies

have indicated that psychosocial factors, such as somatic symptoms, hypochondriacal attitudes, and social and mental well-being, explained the variance in self-rated health to a greater extent compared to physical health facors.[2] Moreover, subjective health optimism appears to play a protective role,[3] as shown in a study in which resilience appeared to be a protective mechanism against the deleterious effects of tooth loss.[4]

Lack of communication between patient and physician/dentist might affect their relationship, impair treatment, and contribute to health decline. Several studies in different areas have assessed the disagreement between a patient's perceptions and those of the family, caregivers, or the physician's diagnosis, representing different views of the same situation.[2] Particular attention must be given to elders, because they may be influenced by their own choices and decisions.

Self-rated health status is one of the most used health indicators,[5] and health perception seems to be an important predictor of mortality.[6] Poorer self-rated health (SRH) is associated with poorer health outcomes, greater disease severity, and symptom burden.[7] Poor health status of mouth and teeth can restrict function and cause discomfort, and, as all body parts, also affect the self-rated general health.[8,9] Due to common risk indicators, such as poor nutrition caused by tooth loss, oral health and general health are interrelated especially among older individuals.

Previous epidemiological studies have shown associations between self-ratings and well-being, somatic conditions, and body mass index.[1,2] Hence, assessing general health and oral health self-ratings can contribute to a joint action among different professionals. Oral health perception is an important indicator because it summarizes objective health conditions, subjective responses, and values and cultural expectations.[10] Furthermore, the relationship between oral health and general health is complex and multifaceted, especially in the elderly,[11] in whom general and oral health are more interconnected. According to the authors, some general illnesses that are more prevalent among the elderly may act as predisposing factors for oral health disability, as for example, diabetes that can lead to xerostomia. On the other hand, common oral diseases such as tooth loss and periodontitis may act as predisposing factors for malnutrition and may restrict the consumption of certain foods.

Therefore the aim of this study was to verify the association between sociodemographic, general health, and oral health data with self-rated general and oral health in independent-living older Brazilians. It was hypothesized that SRGH and SROH would have common risk indicators.

Methods

Study design

This cross-sectional study was part of a larger study on independent-living older individuals from the city of Campinas, Brazil – the "Rede FIBRA" study (Frailty in Brazilian Elderly Study), which is a multicenter and multidisciplinary study aimed at identifying conditions of frailty in the elderly (≥ 65 years) from the community to better understand the prevalence, characteristics, and main factors associated with frailty in Brazilian elderly population.

Sample size

Additional details about data collection procedures were published elsewhere.[12] The cognitive status of the participants was assessed with the MMSE (Mini-Mental State Examination) and independence was assessed by their capacity to go to the location where data was collected. If participants did not reach the cut-off point for MMSE[13] according to their schooling (less one standard deviation) they were excused from the second part of the protocol because cognitive deficits could undermine the reliability of self-reported responses. The inclusion criteria were: 65 years old or more, being able to understand the instructions, living permanently in their home (i.e. in the community and in their houses) and being in the census tract. The exclusion criteria comprised severe cognitive impairment, temporary or permanent inability to walk (the use of cane and walker were allowed), localized strength loss and aphasia due to serious stroke, serious impairment due to Parkinson, severe communication difficulties, chemotherapy treatment, severe sensory deficit, and being in the terminal stage of a disease.

Ninety participants were randomly selected from the 835 urban census tracts (about 10 per tract) of Campinas according FIBRA Study criteria. The estimated sample size was of 601 older people living independently in the community (Figure). The sample size was overestimated by 50% in order to account for refusals and exclusions, resulting in 900 participants.[11] The minimum sample size was calculated by the finite population formula to obtain statistical significance for describing the prevalence of biological frailty, use and need of dental prosthesis, presence of natural teeth and soft tissue alterations with prevalence estimates of 50% each (maximum margin of safety) and sampling error of 4% for the general purpose of the FIBRA study.[11] After completing the first part of the protocol, the MMSE was applied and, if the score was lower than the cut-off point, the participant was considered not eligible (n = 211) since cognitive issues could interfere with the ability to answer the questions that were part of the study protocol. If MMSE scores were above the cut-off point, the participant answered the second part of the protocol, which included the self-report of physical health conditions, functionality, expectation of care, depressive symptoms, and life satisfaction.[12]

Of the 900 volunteers, 689 participated in the complete protocol and of those 688 completed the protocol for SRGH and 673 for SROH (*i.e.* older persons for whom questionnaire information on these data were available) and were analyzed in the present study.

Ethics

This study was conducted after approval from the Ethics Committee on Research involving Human Beings of the Piracicaba Dental School/University of Campinas (N°. 15/2009). The purpose of the study was explained to participants before they were asked to sign the informed consent. The interview started with identification and MMSE application.

Interview and data collection

Outcomes

Self-rated general health and oral health were both assessed using a single item. Participants were asked to rate their general health and oral health based on
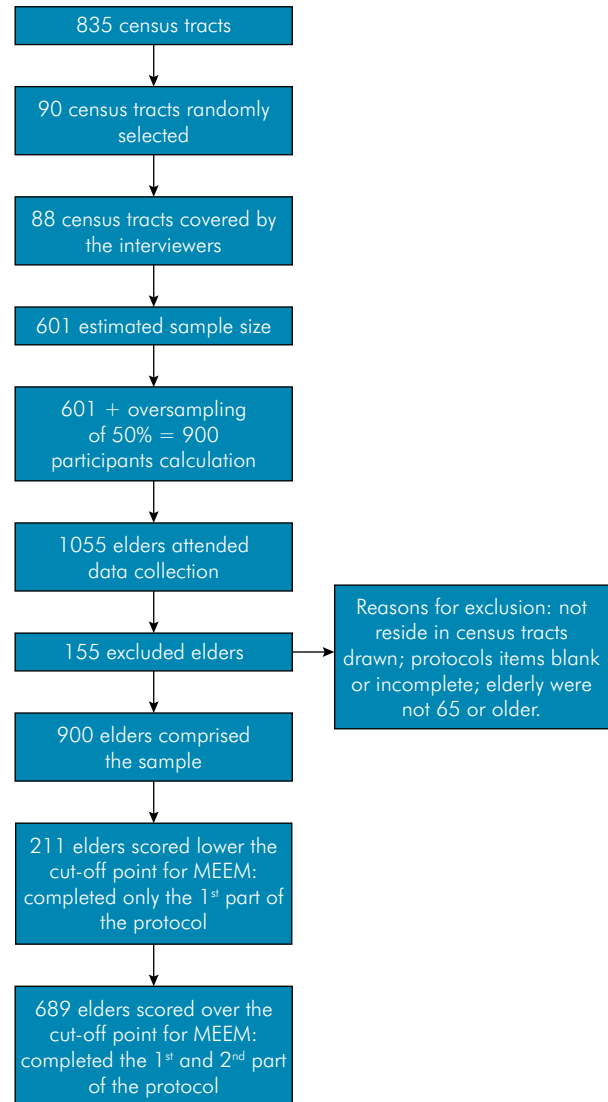
Figure. Flowchart of the sampling procedure.

the questions: "How do you rate your general health?" and "How do you rate your oral health?". For both questions the possible answers were: very good, good, regular, bad, or very bad. These were afterwards grouped into two categories: good (good/very good) and bad (regular/bad/very bad).

Sociodemographic data and smoking status

Sociodemographic data included age (in years), self-reported socio-economic status [assessed trough the question "Do you think you (and your partner) have enough money to cover daily expenses?", yes or no), schooling (in years), self-reported race/skin

color (white/ black/ brown/ indigenous/asian), sex (male/female), and marital status (married/ single/ divorced/ widow). Sociodemographic variables and current smoking status (assessed through the question "Do you currently smoke?" (yes/no) were assessed in an interview to answer the questionnaire. Age and schooling were transformed from continuous into ordinal variables (age-group 65–69/ 70–74/ 75–79/ ≥ 80 years-old and illiterate/ 1–8 years/ > 8 years, respectively). Race/skin color and marital status were categorized into white/non-white and married/ widow, single, divorced.

General health assessment

The variable "number of chronic diseases" (heart problem/ hypertension/ stroke/ diabetes mellitus/ cancer/ arthritis/ lung disease/ depression/ osteoporosis) was created based on the self reported diseases. A summary measure was used in the analyses.

Depressive symptoms were assessed with the Geriatric Depression Scale (GDS) - Brazilian Portuguese short version[14]. The cut-off point was ≤5 for absence and > 5 for presence of symptoms.

The frailty criterion as proposed by Fried et al[15] is determined by the presence of three or more of the following criteria: unintentional weight loss, self-reported exhaustion, weakness (decreased grip strength), slow walking speed, and low physical activity level. Participants were categorized into non-frail (0 criteria), pre-frail (1 or 2 criteria), or frail (3 or more).

Oral health assessment

Oral health was assessed by self-reported food limitation, xerostomia, presence or absence of natural teeth, and denture use. They were each measured by single questions:

a. Self-reported food limitation was assessed with the question "How often did you limit the types or amount of food you eat because of problems with your teeth or dentures (in the past three months)?" with always, sometimes and never as possible answers. Afterwards, always and sometimes were combined and considered as yes;

b. Presence and absence of natural teeth was assessed with the question "Do you have any natural teeth?" (yes or no);

c. Denture use was assessed by the question "Do you wear a denture?" (yes or no);

d. Xerostomia was assessed by the question "Have you experienced dry mouth in the last 4 weeks?" (yes or no).

Associations with the outcomes were adjusted for sociodemographic variables, including age (65–69/70–74/75–79/ ≥ 80 years), race/skin color (white/non-white), sex (female/male), marital status (married/ widow, single, divorced), schooling (illiterate/1–8 years/> 8 years), and having enough money to cover daily expenses (yes/no). Associations were also adjusted for depression symptoms (present/absent), smoking status (yes/no), frailty (not frail / pre-frail/frail), number of chronic diseases (0–2/ ≥ 3 diseases), and oral status represented by the presence of natural teeth (present/ absent), denture use (yes/ no), xerostomia (yes/ no), and self-reported food limitation due to problems with denture or lack of it (yes/ no).

The variables that presented two possible answers (i.e. variables that were dichotomized) were coded as 0 and 1, being 1 always given for the worst condition. The variables that had three possible answers (as schooling and frailty) were coded in an ascending order, from best to worst.

Statistical analyses

Two separate analyses were performed for each outcome using the same procedures. The outcomes were dichotomized into good and bad self-perception. Categorical data are presented as counts and percentage. Chi-square test was performed to assess differences between the studied variables including sociodemographic, behavioral, and general health and oral health assessments with the outcomes. To test the study hypothesis, all independent variables that showed association with p < 0.25 in the bivariate analyses were candidates for the multivariate Poisson regression model. Also, all epidemiological relevant variables were included in the analysis. Variables that did not contribute to the model (p>0.25) were excluded and a new model was developed. The old and new models were always compared. The model was developed using the Enter (backwards) method. A Poisson regression

analysis with robust variance was used to estimate crude and adjusted prevalence ratio (PR), and 95% confidence intervals (95%CI) were calculated for the variables of interest with both the outcomes (SRGH and SROH). Unadjusted Poisson analyses were performed to provide a preliminary assessment of the association between covariates and the outcomes; the adjusted regressions were used to evaluate the final associations, verifying if the covariates were common to both outcomes. All statistical analyses were carried out using the PASW Statistics software version 18 (IBM SPSS Statistics 18, NY).

Results

The characteristics of the study participants are presented in Table 1. Of the 689 participants (mean age 72.28 (± 5.4) years), 47% had edentulism (n=315) and 16% had 20 or more teeth. The majority was women (68.3%) and white (73.4%). A hundred and eighty four (27.6%) reported bad oral health (very bad – 0/ bad 3.8%/ regular 23.8%) and 283 (41.1%) reported bad general health (very bad – 1.3%/ bad 4.5%/ regular 35.3%). Of those reporting bad general health, 15% also reported bad oral health and 45.9% (306) reported good general health and good oral health (p < 0.001, data not shown). In the total sample, 8% were frail.

The adjusted analysis revealed that the probability of rating general health as bad was higher for illiterate participants (PR: 1.77, 95%CI: 1.13–2.77) or with low educational level (PR: 1.76, 95%CI: 1.17–2.65), with depressive symptoms (PR: 1.45, 95%CI: 1.21–1.74), that self-reported food limitation due to problems with denture or lack of it (PR: 1.29, 95%CI: 1.05–1.56), and xerostomia (PR: 1.40, 95%CI: 1.17–1.67). The probability of rating general health as bad was lower for participants with 0–2 chronic diseases (PR: 0.64, 95%CI: 0.53–0.78) and who were pre-frail (PR: 0.76, 95%CI: 0.61–0.96) compared to frail participants.

With regard to self-rated oral health, in the adjusted analysis the probability of rating oral health as bad was higher for participants with natural teeth (PR: 1.61, 95%CI: 1.24-2.08), that reported xerostomia (PR: 1.44, 95%CI: 1.13–1.84) and food limitation (PR: 1.43, 95%CI: 1.07–1.91), and lower for participants that reported having enough money to cover daily

life needs (PR: 0.78, 95%CI: 0.61–0.99) – Table 2. The fit of each model was assessed using AIC (Akaike Information Criteria, lower values indicating better fit) and BIC (Bayesian Information Criteria, lower values indicating better fit).

Both models were tested, and overdispersion was not observed (data not shown).

Discussion

In the present study, we sought to evaluate health and oral health by physical, behavioral, and mental health characteristics in a group of elderly persons. The same variables were used to assess the factors related to SRGH and SROH. Our results suggest that there are common explanatory variables related to both outcomes, since two out of three oral health variables were associated with both SRGH and SROH. According to Okunseri et al.,[16] who studied an ethnic minority group, participants who reported good/excellent oral health were almost six times more likely to report good/excellent general health. In another study with residents of a retirement community, SROH alone added 5.4% to the variance explained in SRGH showing that SROH is related to people's perceptions of themselves, which is an important aspect when rating their health and their ability to function well[8]. In addition, in the same way as general health, oral health may symbolize old age and fears of limited function, dependence, poor appearance, discomfort, and pain.[8]

Xerostomia was associated with higher prevalence of both bad SRGH and SROH. This condition is a quite common complaint in the elderly population,[17] possibly because of polypharmacy and discomfort affecting their quality of life. Matear et al.[17] observed a relationship between xerostomia and poor general health, and associated this with the presence of diseases and respective medications. Further, self-report of food limitation was also associated with both SRGH and SROH. This might reflect limited physical function and is probably the reason why both self-perceptions were affected in older participants. According to Inukai et al.,[23] difficulty with chewing can have a direct or indirect impact on the psychological and social dimensions of oral

Table 1. Socio-demographic, personal, general, and oral health characteristics and frequency distributions of study sample according to the outcomes SRGH (n = 688) and SROH (n = 673).

Variables	Good SRGH*	Bad SRGH*	Good SROH**	Bad SROH**
	n (%)	n (%)	n (%)	n (%)
Sex				
Female	272 (67.2%)	198 (70.0%)	341 (70.0%)	124 (66.7%)
Self-report of enough money to cover daily expenses				
Yes	251 (62.8%)	145 (51.4%)	292 (60.6%)	97 (52.4%)
Schooling				
Illiterate	57 (14.1%)	56 (19.8%)	77 (15.8%)	34 (18.3%)
1–8 years	263 (64.9%)	207 (73.1%)	336 (69.0%)	124 (66.7%)
> 8 years	85 (21.0%)	20 (7.1%)	74 (15.2%)	28 (15.1%)
Race/skin color				
White	313 (77.3%)	192 (67.8%)	366 (75.2%)	129 (69.4%)
Marital status				
Married	226 (55.8%)	151 (53.4%)	266 (54.6%)	102 (54.8%)
Age-group				
65–69 years-old	148 (36.5%)	102 (36.0%)	170 (34.9%)	75 (40.3%)
70–74 years-old	125 (30.9%)	102 (36.0%)	164 (33.7%)	61 (32.8%)
75–79 years-old	83 (20.5%)	53 (18.7%)	99 (20.3%)	33 (17.7%)
≥ 80 years-old	49 (12.1%)	26 (9.2%)	54 (11.1%)	17 (9.1%)
Number of chronic diseases				
0–2 diseases	276 (68.1%)	115 (40.8%)	286 (59.1%)	93 (50.5%)
Depressive symptoms				
Present	44 (11.1%)	88 (31.8%)	87 (18.0%)	44 (24.2%)
Frailty				
Not frail	191 (47.2%)	112 (39.6%)	223 (45.8%)	74 (39.8%)
Pre-frail	204 (50.4%)	147 (51.9%)	241 (49.5%)	99 (53.2%)
Frail	10 (2.5%)	24 (8.5%)	23 (4.7%)	13 (7.0%)
Smoking status				
Yes	45 (11.1%)	32 (11.3%)	49 (10.1%)	25 (13.6%)
Natural teeth				
Present	225 (57.3%)	131 (47.0%)	239 (49.3%)	116 (62.7%)
Self-reported food limitation due to problems with denture or lack of it				
Yes	40 (10.2%)	55 (19.9%)	56 (11.9%)	35 (19.1%)
Denture use				
Yes	253 (67.3%)	205 (75.1%)	342 (72.6%)	116 (64.8%)
Xerostomia				
Yes	144 (36.5%)	152 (55.1%)	199 (40.9%)	101 (54.3%)

*Self-rated general health; **Self-rated oral health.

health. The association of these two covariates with the outcomes may be interpreted as weak, since there are other factors such as age itself that are extremely relevant for perceived health and perceived oral health status.

The absence of teeth may affect food choice and nutritional status, and thus influence general health condition. Interestingly, although tooth loss and denture use are considered natural characteristics of the aging process among the elderly, denture use was not associated with any of the outcomes, but the presence of natural teeth was associated with higher prevalence of bad SROH. A possible explanation for this could be related to the identification of other

Table 2. Crude and adjusted prevalence ratios and 95% confidence intervals (CI) of the variables associated with SRGH and SROH.

Variables	SRGH*		SROH**	
	Crude	Adjusted	Crude	Adjusted
	PR (95% CI)	PR (95% CI)	PR (95% CI)	PR (95% CI)
Sex				
Female	1.08 (0.88–1.31)	0.93 (0.77–1.13)	–	–
Male	1	1		
Self-report of enough money to cover daily expenses				
Yes	0.76 (0.64–0.91)	0.91 (0.77–1.09)	0.75 (0.58–0.98)	0.78[a] (0.61–0.99)
No	1	1	1	1
Schooling				
Illiterate	2.60 (1.68–4.02)	1.77[a] (1.13–2.77)	–	–
1–8 years	2.31 (1.53–3.47)	1.76[b] (1.17–2.65)	–	–
> 8 years	1	1		
Number of chronic diseases				
0–2 diseases	0.52 (0.43–0.62)	0.64[b] (0.53–0.78)	–	–
≥ 3 diseases	1	1		
Depressive symptoms				
Present	1.91 (1.62–2.26)	1.45[b] (1.21–1.74)	–	–
Absent	1	1		
Frailty				
Not frail	0.52 (0.40–0.68)	0.81 (0.62–1.04)	–	–
Pre-frail	0.59 (0.46–0.76)	0.76[a] (0.61–0.96)	–	–
Frail	1	1		
Natural teeth				
Present	0.78 (0.65–0.94)	0.85 (0.72–1.01)	1.45 (1.10–1.92)	1.61[b] (1.24–2.08)
Absent	1	1	1	1
Self-reported food limitation due to problems with denture or lack of it				
Yes	1.50 (1.23–1.84)	1.29[a] (1.05–1.56)	1.54 (1.14–2.07)	1.43[a] (1.07–1.91)
No	1	1	1	1
Xerostomia				
Yes	1.55 (1.29–1.86)	1.40[b] (1.17–1.67)	1.53 (1.18–1.99)	1.44[b] (1.13–1.84)
No	1	1	1	1

[a]p < 0.05; [b]p < 0.01; *Self-rated general health; **Self-rated oral health.

factors that may be considered more important to older individuals than having teeth. Moreover, the results suggest that perceptions are more carefully assessed in SROH, so the expectation and evaluation

of a person's natural teeth condition is more rigorous, leading older participants to consider this aspect in their critical judgment. In addition, it is possible that the self-report of having natural teeth might be a good estimator of oral clinical status but may lack ability to identify self-perception of general health. Another possibility is that the self-perception of general health is not affected by the number of natural teeth whereas for some elders tooth extraction can 'prevent' future pain.[18] Gibson et al.[19] assessed homeless veterans perception and those who received emergency dental care showed a decline in their GOHAI scores (General Oral Health Assessment Index) from baseline until after dental treatment, in comparison with those who received comprehensive dental care. These findings suggest that the use of health services may contribute to the sense of awareness that amplifies perceptions.[20,21] Moreover, when comparing preventive dental care and restorative work, those who visited the dentist for regular check-ups were more likely to report their oral health to be good/excellent.[16] According to Haikal et al.,[22] who assessed the perception of elderly persons living in a Brazilian facility, those who rated their oral health as poor or fair reported the need to visit the dentist, suggesting that self-perception of oral health is a predictor of need for dental care. However, teeth esthetics, position, and functional status were not analyzed, and this may have resulted in a study limitation.

Having no or few diseases was related to a lower perception of bad general health. Although Kieffer and Hoogstraten[24] studied young adults, they also found that those who reported more health symptoms seemed to regard their general health as being worse. A previous longitudinal research with older adults revealed that those who experienced fewer health problems and functional impairment felt more in control later in life.[6] The aggregation of chronic diseases into two categories (0–2 / ≥ 3 diseases) was done based on studies that examined the association of comorbidities and perceived health.[25]

Mental health changes have been closely related to changes in self-rated health.[7] Depression predicts adverse health outcomes[26] and has an impact on mortality, disability, and quality of life. A useful tool for physicians is to question patients about perceived health in order to reveal a hidden depressive state.[27] Some studies have shown an association between oral health and depression, since it can affect self-esteem and function.[28] Depression was assessed in separate because it is known to coexist with chronic diseases and to be associated with general functioning.[29] Interestingly, depression was not associated with bad SROH in this study.

Frailty is a multifactorial state that also implies vulnerability to adverse outcomes in the elderly.[30] In a study with Mexican elderly, the authors reported an increase in the probability of frailty among those who perceived their oral health as worse than others of the same age.[31] In our study, we found pre-frail older participants to be associated with bad SRGH when compared to frail participants. Interestingly, there was no association between non-frail participants and SRGH and it might have been due to the fact that other variables that might interfere in the relation were not assessed or even because elders did not perceived pre-frailty as a problem since it is a transitional state between being non-frail and being frail. In addition, some of the frail conditions are more severe than others and frailty status includes a higher number of conditions than pre-frailty, which might have influenced the result found. This also may be attributable to other comorbidities that are associated with health perception and may be more frequent in older adults who are not frail.

In this study, literacy, educational level, and having enough money to cover daily expenses represented proxies of socioeconomic status, which may have an effect on access, use of dental care, and preventive information, endorsing positive behavior and attitudes.[32] High educational level and good socioeconomic condition can affect the level of awareness regarding general and oral health. Individuals with poor conceptual knowledge of oral health issues may not understand and be able to differentiate between good and bad oral health behaviors.[33] Borrell et al.[34] observed that less educated and low-income New York adults were more likely to rate their general and oral health as poor, suggesting that socioeconomic characteristics may affect an individual's behaviors and access to resources that could improve feelings of wellbeing and

life satisfaction. These results are in agreement with ours, in which illiteracy and low educational level were associated with poor perception of general health, and having enough money to live was associated with lower prevalence of bad SROH.

In our study, age and sex did not seem to be related to the two outcomes evaluated. Oksuzyan et al.,[35] who compared population-based self-rated health (SRH) studies conducted in Denmark, Japan, and the US, also observed no substantial differences regarding sex, but found an age-related decline in SRH. In another cross-sectional study, global SRH was found to decline with increasing age.[36]

The hypothesis of reverse causality does not determine whether or not the exposure preceded the outcome; also, temporality cannot be inferred in cross-sectional studies. Furthermore, we only considered self-reports of presence of natural teeth and denture use, which might have affected the results. In addition, we did not assess the quality and functionality of the denture, the number of teeth, or the combination of prosthesis and natural teeth, factors that might contribute to changes in perception. The absence of a dental examination may have lowered the strength of the oral health data beyond the limitation of a self-perceived health assessment. Another limitation of the study is the attrition/response rate for some of the independent variables.

It is important to mention that this study methodology was based on Fried's and Ferrucci's methodology[15,37] in which older subjects with low MMSE scores were excluded from the analysis to maintain reliability of self-reported data. The cut-off points for the MMSE were adjusted for the Brazilian population following Brucki et al.[13] recommendations. According to Ferrucci and colleagues,[35] frailty resulting primarily from reduced cognition was considered a distinct clinical entity even if it was possible to find cognitive decline in frail persons. The authors also concluded that if a certain level of cognitive function is required for the intervention, subjects whose cognitive function is below this level or expected to cross this threshold during the period of the trial should be excluded, highlighting that some abilities required for the study might be questionable for those participants.

In this study, a single question was used for each of the outcomes. A single question has appeal because of the easy interpretation of responses, the low burden on the patient, and the possibility of serving as "screening items".[38] In addition, the answer to a single question seems to be an integrative summary of one's status in many health-related domains[8], and its use has been recommended when facing limited resources, sample size restrictions, and patient preferences.[38] Even though "regular" and "poor" categories were grouped, which could overestimate the prevalence of poor health[39], the authors considered the categorization adopted the most appropriate for the idea the answers should convey. Besides, it has already been used in previous studies[39] and it keeps in line with previous research that we published on self-perceived health and self-perceived oral health as outcomes.[40]

Self-rating is an effective and simple option that allows the physician to concentrate on the central problems of patients considering their life situation, determine their needs and expectations,[2] and employ ancillary personnel to collect information[32]. This method may represent a sensitive, practical, and efficient way to identify groups in which bad SRH could indicate an opportunity for intervention and for monitoring the impact of this intervention.[7] Furthermore, another FIBRA Study assessing the same volunteers as this study showed that self-reported oral condition is a valid measure for older people, reflecting their clinical oral condition,[40] therefore SRGH and SROH are both useful in epidemiological studies and primary care.

Conclusion

Our results suggest that oral health data and income seem to be related to self-perceptions of general and oral health. Therefore, using self-rated questions may allow professionals to gain better understanding of their patients and the aspects important to them that can impact their lives. Epidemiologically, it is a simple way to assess how a population copes.

Acknowledgments

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